quired some kind of notion on the subject of typhoid fever. Each morning paper became a kind of daily *Lancet*. It is not much to the credit of the medical profession that there has been a great deal of confusion between typhus and typhoid. The latter, from which our prince suffered, is totally distinct from typhus, and has its own distinctive marks, as much as small-pox itself. An eminent physician suggests that it should be called the *pythogenetic* fever, which is, however, begging the question at issue, which is the great medical problem of our time, whether this disease is the result of malaria or of contagion. Dr. Budd argues that as it is in typhoid fever, so it is in small-pox; as it is in small-pox, so it is in measles; as it is in measles, so it is in scarlatina; as it is in scarlatina, so it is in malignant cholera: amid all varying phenomena, *one thing constant, a specific morbid cause*, "a cause which is neither a permanent product of the soil, nor of the air, nor of particular seasons, but which is susceptible of transmission from place to place; which breeds as it goes, and then again dies out, or becomes dormant, without leaving any sign to mark its track."

The slaughter of the Franco-Germanic War is repeated year by year in England by preventible diseases. This enormous mass of disease furnishes ample material for infection on every side. A most infinitesimal germ, invisible, impalpable, would suffice to infect a single human body, and that body might suffice to infect very many others. It may be said that the link of connection is not always sufficiently clear between the infector and the *infectee*. In a vast proportion of cases this is clear enough, and it is no argument where it is not. People have been taken ill of small-pox even in prison, under solitary confinement; yet how could we doubt of real though remote infection? Let each individual do his part in the holy crusade against ignorance and disease. Let it be asked, amid contemplated legislation, whether the state cannot give effectual hope. We may then hope to transmit to our children their heritage of earth and time less stained by scalding tears and passions of regret than it has been to us and to our fathers.—*London Society*.

THE EXPRESSION OF THE EMOTIONS.

WHATEVER may be the ultimate verdict as to the truth of those views which are associated with the name of Darwin, it certainly cannot be denied that Mr. Darwin himself has a profound belief in them. The work which he has just published, under the title "On the Expression of the Emotions in Man and Animals," is a new test to which he subjects his own doctrines. He considers the subject from the point of view of evolution, and, though many may consider

that he is far from having established his case, it will be admitted by every reader that he has thrown much new light upon it, and made a most fascinating and instructive book. Mr. Darwin distinguishes between physiognomy and expression. The former is statical, the latter dynamical. Physiognomy aims at the recognition of character through the study of the permanent form of the features. Expression, on the other nand, deals with actions, or the play of features and gesture in man and animals, as constituting the natural language of the feelings. Much has been written upon the subject of Expression by men of various countries, but Mr. Darwin recognizes that Sir Charles Bell, in his "Anatomy and Philosophy of Expression," published in 1806, not only laid the foundations of the subject as a branch of science, but built it up into a noble structure. Mr. Darwin is of opinion that the subject has hitherto been pursued by a false method, or has been vitiated in its treatment by erroneous assumptions. Bell, Gratiolet, Duchenne, and the other leading writers upon the question, have dealt with it on the old hypothesis, that the different animal species came into existence just as they are now, wholly distinct from each other; but Mr. Darwin maintains that, so long as man and all other animals are viewed in this way as independent creations, the true philosophy of the subject cannot be reached. The simple before the complex; the lower forms of life as interpreting the higher, and the whole as a connected scheme of development, is now the method of biology, and for this investigation it is, therefore, necessary to study the manifestations of character in their simplest forms.

An able writer in the *Saturday Review* summarizes Mr. Darwin's views as follows: "The tendency to draw as broadly as possible the distinction between man and brutes led Sir Charles Bell to deny to the lower animals any expression beyond what might be referred more or less plainly to acts of volition or necessary instincts, their faces seeming to him to be chiefly capable of expressing merely rage or fear. The facial muscles in man he thought to be a special provision for the sole object of expression, and so far distinctive of humanity. But the simple fact that the anthropoid apes possess the same facial muscles that we do, renders it most improbable, apart from any reference to teleology in general, that we were endowed with these muscles for any such purpose, still more that monkeys had special muscles given to them solely for the purpose of exhibiting their hideous grimaces. Since distinct uses can, with much probability, be assigned to almost all the facial muscles, we may look upon expression as but an incidental result of muscular or organic function. Mr. Darwin's early inclination toward the doctrine of evolution, or the origin of man from lower forms, led him five-and-twenty years ago to regard the habit of expressing our feelings by certain movements, innate as it has now become, as having been in some manner gradually acquired at the first. Seeking back for the origin of movements of this kind, he, in the first place, was

led to observe infants, as exhibiting emotions with extraordinary force, as well as with a simplicity and an absence of convention which cease with more mature years. Secondly, the insane had to be studied, being liable to the strongest passions, and giving them uncontrolled vent. Dr. Duchenne's ingenious application of photography, representing the effects of galvanism upon the facial muscles of an old man, gave some assistance toward distinguishing varieties of expression. Less aid than was expected was found to be derived from the study of the great masters in painting and sculpture; beauty in works of art excluding the display of strong facial muscles, and the story of the composition being generally told by accessories skilfully introduced. More important it was to ascertain how far the same expressions and gestures prevail among all races of mankind, especially among those who have associated but little with Europeans. With this view a list of 16 questions was circulated by Mr. Darwin within the last five years, to which 36 answers have been received from missionaries, travellers, and other observers of aboriginal tribes, whose names are appended to Mr. Darwin's introductory remarks. The evidence thus accumulated has been supplemented by the close and keen observation of the author himself through a wide range of animal life. It seemed to him of paramount importance to bestow all the attention possible upon the expression of the several passions in various animals, not, of course, as deciding how far in man certain expressions are characteristic of certain states of mind; but as affording the safest basis for generalization on the causes or the origin of the various movements of expression. In observing animals we are not so likely to be biassed by our imagination, and we may feel sure that their expressions are not conventional.

"As the result of his observations, Mr. Darwin has arrived at three principles, which appear to him to account for most of the expressions used by man and the lower animals under the influence of various emotions and sensations. The first of these is the principle of serviceable associated habits. Movements which are of service in gratifying some desire, or in relieving some sensation, become by repetition so habitual that they are performed, whether they are of any service or not, whenever the same desire or sensation is felt, even in a very weak degree. Actions, which were at first performed consciously, become, through habit and association, reflex or automatic—the sensory nerve-cells exciting the motor nerve-cells, without first communicating with those cells on which our consciousness and volition depend. Starting at the approach of danger, and blinking with the eyelids so as to protect the eyes, become perfectly spontaneous. Reflex actions, too, gained for one purpose, may be modified independently of the will or of habit, so as to serve for some other distinct purpose; or, they may be developed through natural selection. And they are thus often brought into play in connection with movements expressive of emotion. When movements associated through habit with certain mental states are partially

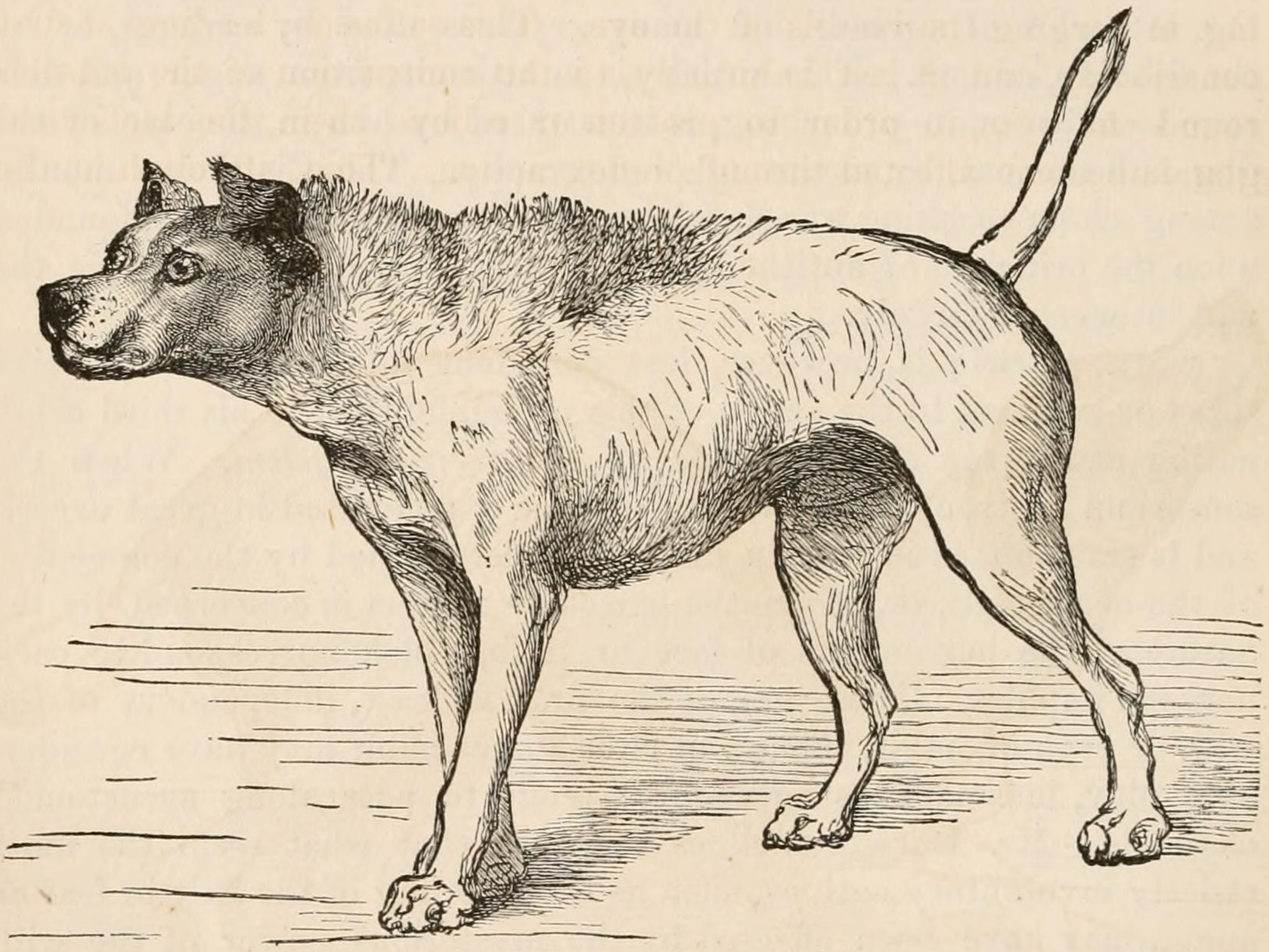
repressed by the will, the strictly involuntary muscles retain their action, and may be highly expressive; and when, on the other hand, the will is relaxed, the voluntary muscles fail before them. Debility of the brain, Sir C. Bell remarked, is most shown in the case of those muscles which are in their natural condition most under the control of the will. A further mode of expression arises when the checking of one habitual movement calls up another.

"The second principle is that of antithesis. When certain movements or gestures have been acquired as aforesaid, and have come to be habitually performed in connection with a certain state of mind, there will then be a strange and involuntary tendency under the opposite state of mind to directly opposite movements, whether in any way serviceable or not. Hence alone, Mr. Darwin thinks, can be explained, not only the sudden and extreme changes of expression in the attitudes of animals, but many gestures used by savages, or by the deaf and dumb. This antithesis in attitude, from anger and defiance to affectionate crouching, is illustrated by him in the case of the dog and the cat, by means of photography. The Cistercian monks, among whom speaking was sinful, invented a gesture language, founded upon the principle of antithesis. It is clear that in this principle the will intervenes largely.

"Mr. Darwin is, however, less confident in referring expressive signs or gestures to the action of this principle, than to his third originating cause, *the direct agency of the nervous system.* When the sensorium is strongly excited, nerve-force is generated in great excess, and is transmitted in certain directions, determined by the connection of the nerve-cells, or, where the muscular system is concerned, by the nature of the movements of face or limb, which correspond to each nervous impulse. These are, at the first, at least, independent of the will, or even of habit, though in later stages habit may have considerable play, inasmuch as nerve-force tends to pass along accustomed channels. Mr. Darwin inclines to think that what seem the most strictly involuntary actions, such as the bristling of the hair in fear or anger, may have been effected by the mysterious power of the will. He is far, however, from laying down dogmatic views upon the operation of these various agencies in causing or varying expression, nor is he prepared to draw sharp lines between the action of his three elementary principles. Many phases or signs of expression may partake, he considers, of all three, and may be referable to no single or direct physiological cause. The visible apparatus of expression may ot course be taken as muscular, and he begins with laying down diagrams of the various muscles of the face in man, those in particular which are connected with the eyes and mouth. . . . . Suppose we take as an illustration the oblique or upturned eyebrows of a man suffering from grief or anxiety. Every one must be familiar, both from Nature and works of art, with the way in which the inner angle of the eye-

brow is drawn up under this emotion, the forehead being contracted or wrinkled at the same time. Mr. Darwin evolves the origin of this involuntary movement, through the same logical train of sequence by which we have seen him, in his earlier and more elaborate works, draw out the extraordinarily complex chain of laws, which runs through natural history. When infants scream loudly from hunger or pain, the circulation is affected, and the eyes tend to become gorged with blood. In consequence, the muscles surrounding the eyes are strongly contracted by an involuntary action as a protection. This action, in the course of many generations, has become firmly fixed and inherited. With advancing years and culture, the habit of screaming is partially repressed; but the muscles round the eyes still tend to contract when-

FIG. 1.

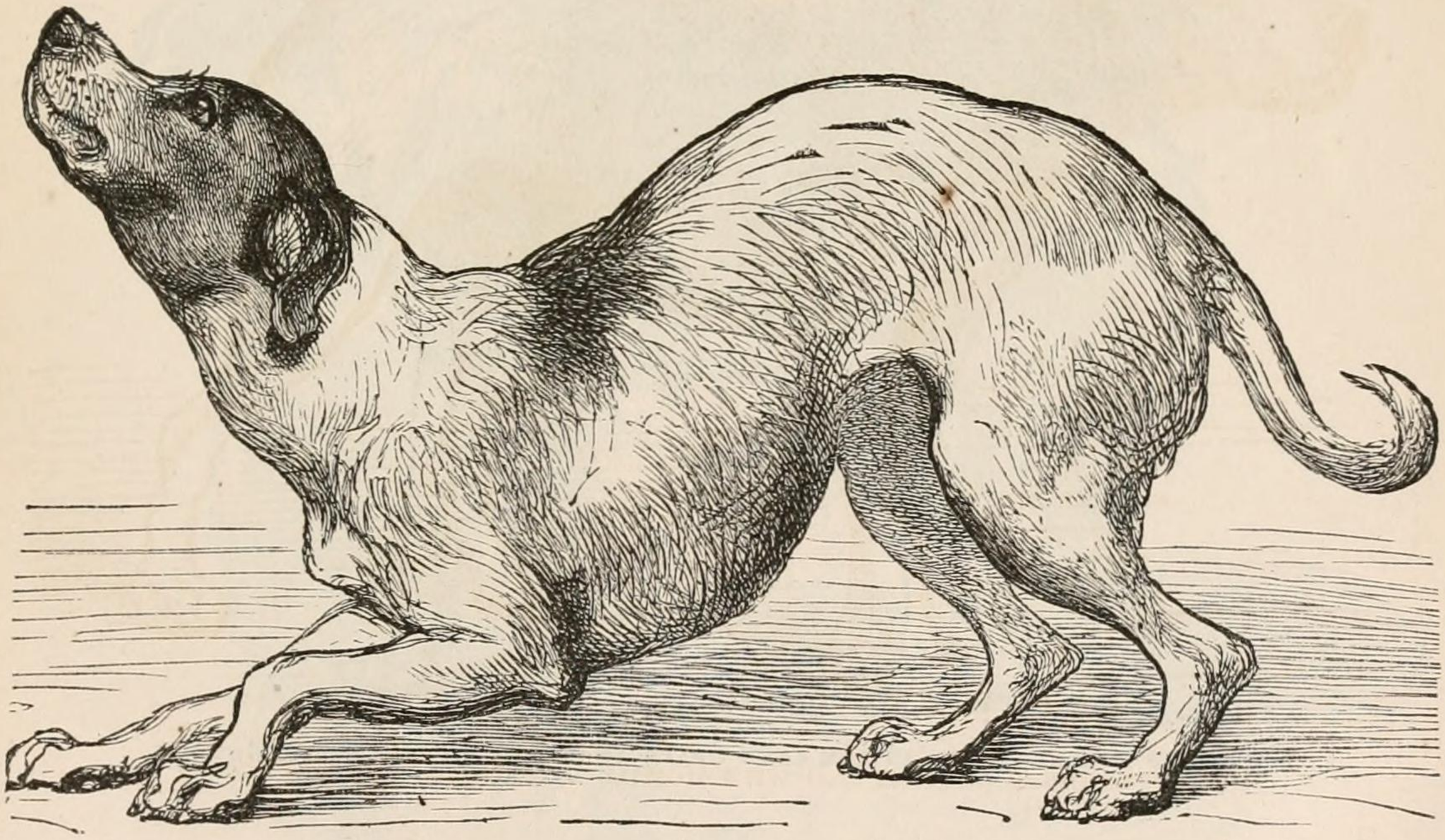


DOG APPROACHING ANOTHER DOG WITH HOSTILE INTENTIONS.—(By M. Riviere.)

ever even slight distress is felt. Of these the pyramidal muscles of the nose are less under the control of the will than the others, and their contraction can be checked only by that of the central fasciæ of the frontal muscle. These latter fasciæ draw up the inner ends of the eyebrows, and wrinkle the forehead in the peculiar manner which we immediately recognize as the expression of grief or anxiety. Laughter and tears form media of expression, which have been often subjected to analysis, but never with the same physiological minuteness and precision as in Mr. Darwin's special chapters on the phenomena of the vaso-muscular and nervous systems. The excess of nervous

energy produced by pleasure and enjoyment, passing on by an efflux through the motor nerves to various classes of the muscles, finds a vent in joyous merriment, dancing, clapping the hands, and, above all, in emissions of sound and motions of the zygomatic muscles, which draw the mouth backward and upward. From the manner in which the upper teeth are exposed in laughter and broad smiling, Mr. Darwin cannot doubt that some of the muscles running to the upper lip are likewise brought into moderate action. The upper and lower orbicular muscles of the eyes are at the same time more or less contracted, while the contractile force exerted upon the vessels or glands of the eye causes the same flow of tears in extreme laughter as in sorrow. Both laughing and weeping are seen in a minor degree in many of the lower animals. In children tears do not flow, Mr. Darwin assures us, at the first, but are induced by the effect of prolonged screaming, in gorging the vessels of the eye. This suffusion, leading at first consciously, and at last habitually, to the contraction of the muscles round the eyes, in order to protect or relieve them, the lachrymal glands become affected through reflex action. Thus, although in the

FIG. 2.



THE SAME IN A HUMBLE AND AFFECTIONATE FRAME OF MIND.—(By M. Riviere.)

first instance a merely incidental result, as purposeless as the secretion of tears from a blow outside the eye, or as a sneeze from bright light affecting the retina, we may understand how the shedding of tears serves as a natural relief to suffering."

Mr. Darwin's work is profusely illustrated by woodcuts and photographs of the human face, and of the attitudes and expressions of various animals. We give some of his figures, with his accompanying descriptions, exemplifying the principle of antithesis in the dog and cat.

He says: "When a dog approaches a strange dog or man in a savage or hostile frame of mind, he walks upright and very stiffly; his head is slightly raised, or not much lowered; the tail is held erect and quite rigid; the hairs bristle, especially along the neck and back; the pricked ears are directed forward, and the eyes have a fixed stare. (*See* Figs. 1 and 3.) These actions, as will hereafter be explained, follow from the dog's intention to attack his enemy, and are thus to a large extent intelligible. As he prepares to spring with a savage growl on his enemy, the canine teeth are uncovered, and the ears are pressed close backward on the head; but with these latter actions we are not here concerned. Let us now suppose that the dog suddenly

FIG. 3.

HALF-BRED SHEPHERD DOG IN THE SAME STATE AS IN FIG. 1.—(By Mr. A. May.)

discovers that the man whom he is approaching is not a stranger, but his master; and let it be observed how completely and instantaneously his whole bearing is reversed. Instead of walking upright, the body sinks downward or even crouches, and is thrown into flexuous movements: his tail, instead of being held stiff and upright, is lowered and wagged from side to side; his hair instantly becomes smooth; his ears are depressed and drawn backward, but not closely to the head; and his lips hang loosely. From the drawing back of the ears, the eyelids become elongated, and the eyes no longer appear round and staring. It should be added that the animal is at such times in an excited con-

dition from joy; and nerve-force will be generated in excess, which naturally leads to action of some kind. None of the above movements, so clearly expressive of affection, are of the least direct service to the animal. They are explicable, as far as I can see, solely from being in complete opposition or antithesis to the attitude and movements which, from intelligible causes, are assumed when a dog intends to fight, and which consequently are expressive of anger. I request

FIG. 4.

THE SAME CARESSING HIS MASTER.—(By Mr. A. May.)

the reader to look at the four accompanying sketches, which have been given in order to recall vividly the appearance of a dog under these two states of mind. It is, however, not a little difficult to represent affection in a dog, while caressing his master and wagging his tail, as the essence of the expression lies in the continuous flexuous movements.

"We will now turn to the cat. When this animal is threatened by a dog, it arches its back in a surprising manner, erects its hair, opens its mouth and spits. But we are not here concerned with this well-known attitude, expressive of terror combined with anger; we are concerned only with that of rage or anger. This is not often seen, but may be observed when two cats are fighting together; and I have

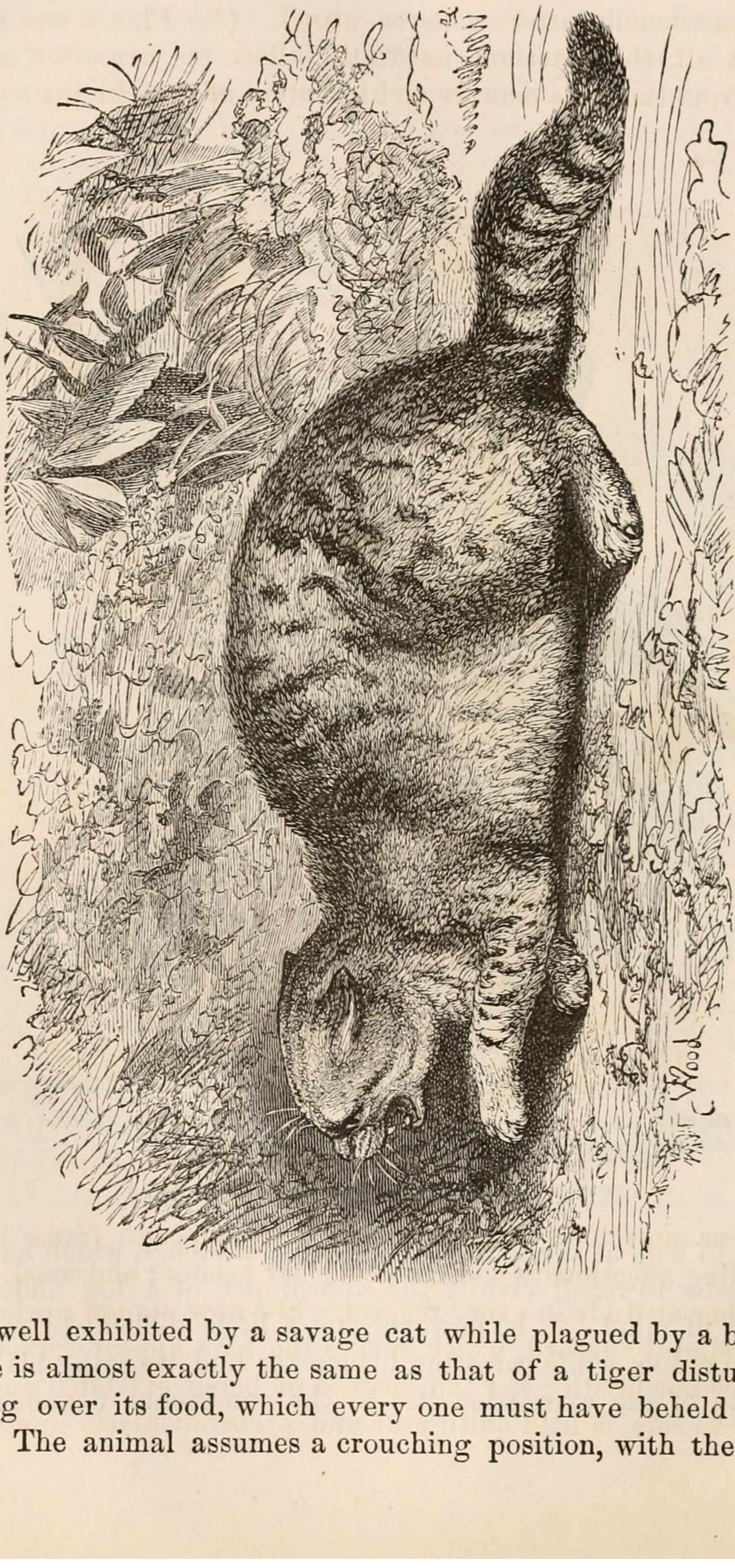


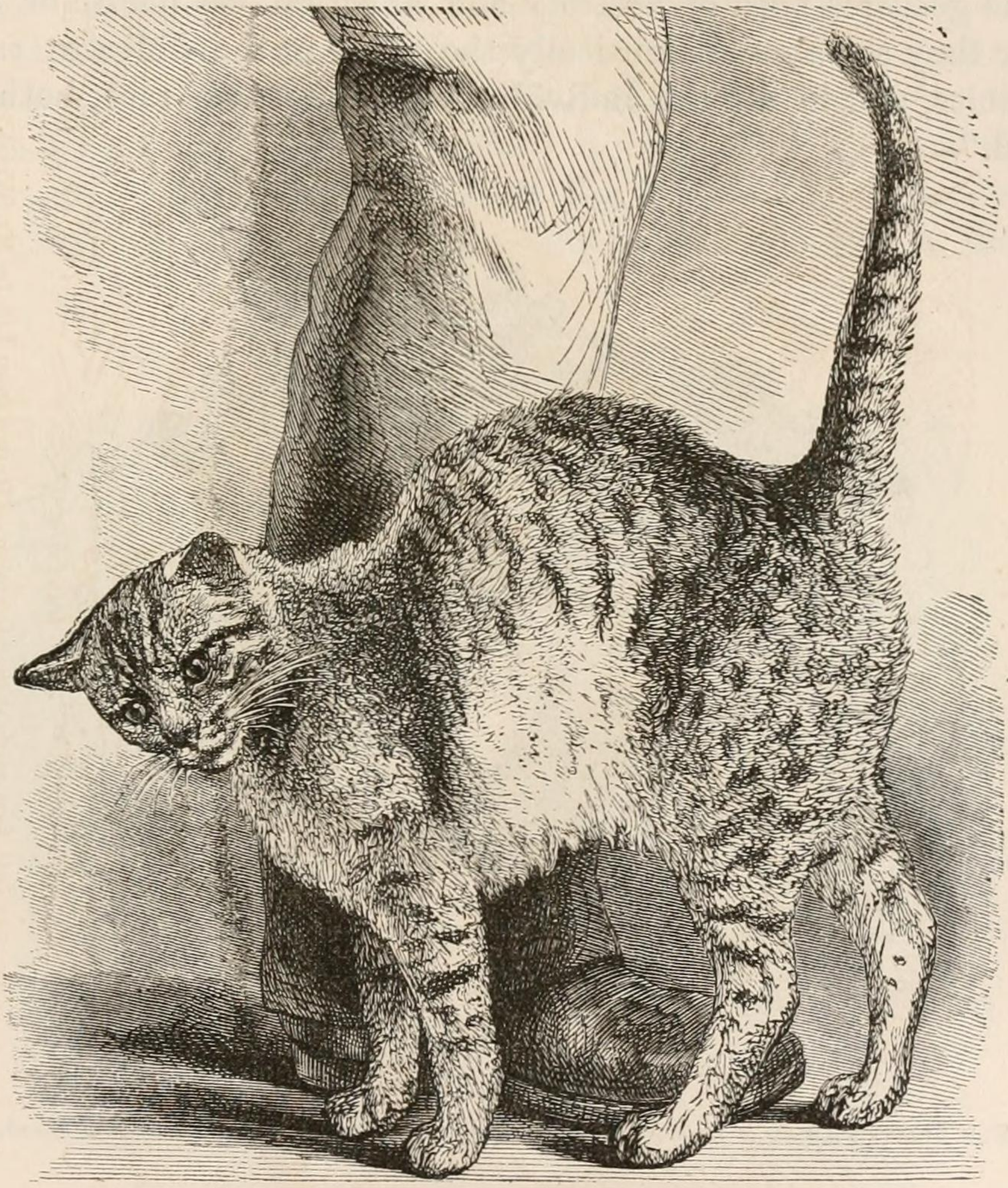
FIG. 5.

CAT, SAVAGE AND PREPARED TO FIGHT.—(Drawn from Life by Mr. Wood.)

seen it well exhibited by a savage cat while plagued by a boy. The attitude is almost exactly the same as that of a tiger disturbed and growling over its food, which every one must have beheld in menageries. The animal assumes a crouching position, with the body ex-

tended; and the whole tail, or the tip alone, is lashed or curled from side to side. The hair is not in the least erect. Thus far, the attitude and movements are nearly the same as when the animal is prepared to spring on its prey, and when, no doubt, it feels savage. But, when preparing to fight, there is this difference, that the ears are closely pressed backward; the mouth is partially opened, showing the teeth; the fore-feet are occasionally struck out with protruded claws; and the animal occasionally utters a fierce growl. (*See* Figs. 5 and 6.) All, or almost all, these actions naturally follow (as hereafter to be explained) from the cat's manner and intention of attacking its enemy.

FIG. 6.



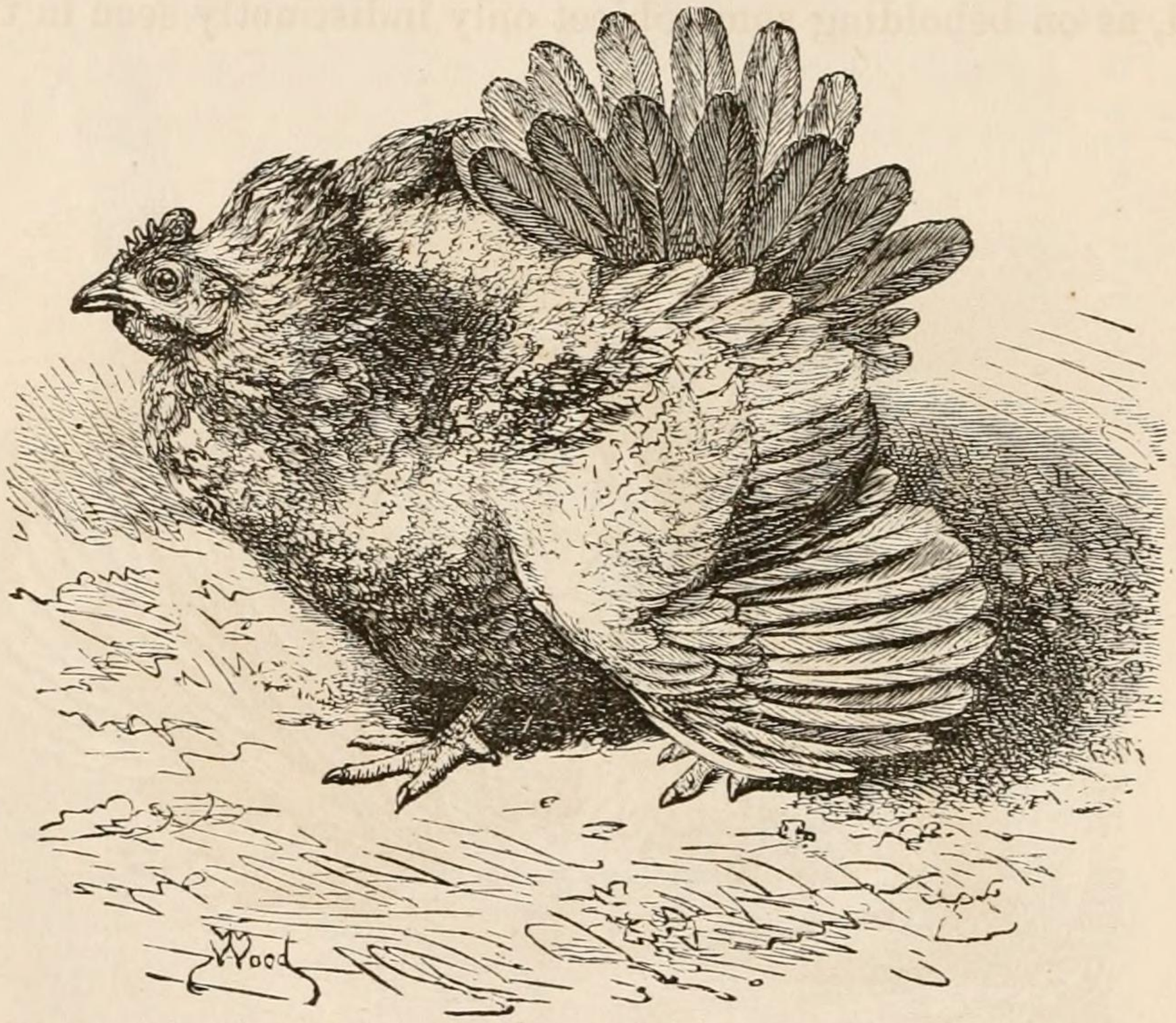
CAT, IN AN AFFECTIONATE FRAME OF MIND.—(By Mr. Wood.)

"Let us now look at a cat in a directly opposite frame of mind, while feeling affectionate and caressing her master; and mark how opposite is her attitude in every respect. She now stands upright, with her back slightly arched, which makes the hair appear rather rough, but it does not bristle; her tail, instead of being extended and lashed from side to side, is held quite stiff and perpendicularly upward; her

ears are erect and pointed; her mouth is closed; and she rubs against her master with a purr instead of a growl. Let it further be observed how widely different is the whole bearing of an affectionate cat from that of a dog, when, with his body crouching and flexuous, his tail lowered and wagging, and ears depressed, he caresses his master. This contrast in the attitudes and movements of these two carnivorous animals, under the same pleased and affectionate frame of mind, can be explained, as it appears to me, solely by their movements standing in complete antithesis to those which are naturally assumed, when these animals feel savage and are prepared either to fight or to seize their prey.

"In these cases of the dog and cat, there is every reason to believe that the gestures both of hostility and affection are innate or inherited; for they are almost identically the same in the different races of the species, and in all the individuals of the same race, both young and old."

FIG. 7.



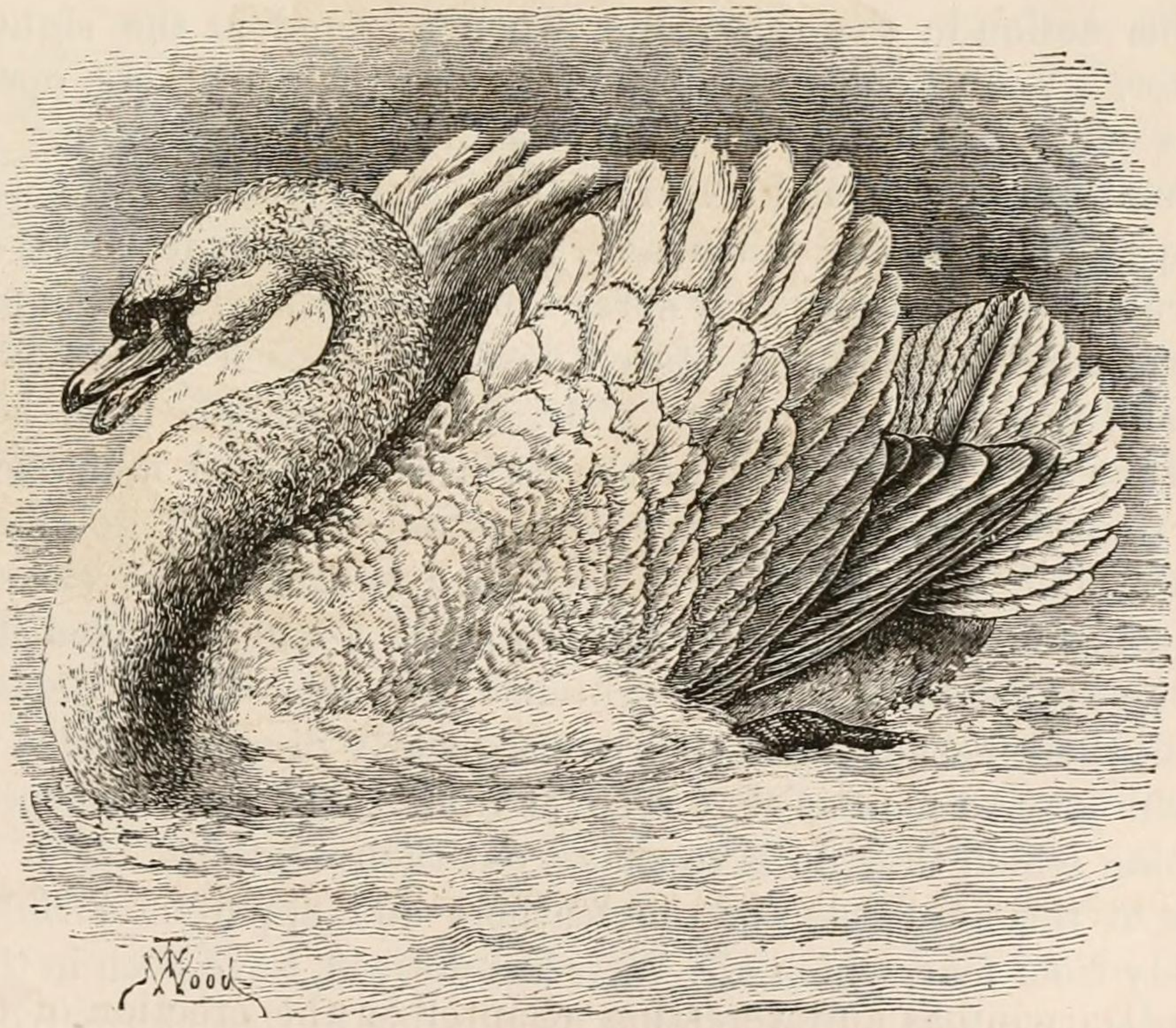
HEN DRIVING AWAY A DOG FROM HER CHICKENS.—(Drawn from Life by Mr. Wood.)

Mr. Darwin has an interesting chapter on the erection of the dermal appendages as expressive of emotion. He observes: "Hardly any expressive movement is so general as the involuntary erection of the hairs, feathers, and other dermal appendages; for it is common throughout three of the great vertebrate classes. These appendages are erected under the excitement of anger or terror; more especially when these emotions are combined, or quickly succeed each other. The action serves to make the animal appear larger and more fright-

ful to its enemies or rivals, and is generally accompanied by various voluntary movements adapted for the same purpose, and by the utterance of savage sounds. Mr. Bartlett, who has had such wide experience with animals of all kinds, does not doubt that this is the case; but it is a different question whether the power of erection was primarily acquired for this special purpose.

"With the carnivora the erection of the hair seems to be almost universal, often accompanied by threatening movements, the uncovering of the teeth, and the utterance of savage growls. The enraged lion erects his mane. The bristling of the hair along the neck and back of the dog, and over the whole body of the cat, especially on the tail, is familiar to every one. With the cat it apparently occurs only under fear; with the dog, under anger and fear; but not, as far as I have observed, under abject fear, as when a dog is going to be flogged by a severe game-keeper. If, however, the dog shows fight, as sometimes happens, up goes his hair. I have often noticed that the hair of a dog is particularly liable to rise, if he is half angry and half afraid, as on beholding some object only indistinctly seen in the dusk.

FIG. 8.



SWAN DRIVING AWAY AN INTRUDER.—(Drawn from Life by Mr. Wood.)

"I have been assured by a veterinary surgeon that he has often seen the hair erected on horses and cattle, on which he had operated and was going again to operate.

"Birds belonging to all the chief orders ruffle their feathers when angry or frightened. Every one must have seen two cocks, even quite

young birds, preparing to fight with erected neck-hackles; nor can these feathers when erected serve as a means of defence, for cock-fighters have found by experience that it is advantageous to trim them. The male ruff (*Machetes pugnax*) likewise erects its collar of feathers when fighting. When a dog approaches a common hen with her chickens, she spreads out her wings, raises her tail, ruffles all her feathers, and, looking as ferocious as possible, dashes at the intruder. The tail is not always held in exactly the same position; it is sometimes so much erected, that the central feathers, as in the accompanying drawing, almost touch the back. Swans, when angered, likewise raise their wings and tail, and erect their feathers. They open their beaks, and make by paddling little rapid starts forward, against any one who approaches the water's edge too closely. Tropic birds [1] when disturbed on their nests are said not to fly away, but 'merely to stick out their feathers and scream.' The barn-owl, when approached, 'instantly swells out its plumage, extends its wings and tail, hisses and clacks its mandibles with force and rapidity.' [2] So do other kinds of owls. Hawks, as I am informed by Mr. Jenner Weir, likewise ruffle their feathers, and spread out their wings and tail under similar circumstances. Some kinds of parrots erect their feathers; and I have seen this action in the cassowary, when angered at the sight of an ant-eater. Young cuckoos in the nest raise their feathers, open their mouths widely, and make themselves as frightful as possible.

"Small birds, also, as I hear from Mr. Weir, such as various finches, buntings, and warblers, when angry, ruffle all their feathers, or only those round the neck; or they spread out their wings and tail-feathers. With their plumage in this state, they rush at each other with open beaks and threatening gestures. Mr. Weir concludes from his large experience that the erection of the feathers is caused much more by anger than by fear. He gives as an instance a hybrid goldfinch of a most irascible disposition, which, when approached too closely by a servant, instantly assumes the appearance of a ball of ruffled feathers. He believes that birds when frightened, as a general rule, closely adpress all their feathers, and their consequently diminished size is often astonishing. As soon as they recover from their fear or surprise, the first thing which they do is to shake out their feathers. The best instances of this adpression of the feathers and apparent shrinking of the body from fear, which Mr. Weir has noticed, have been in the quail and grass-parrakeet. The habit is intelligible in these birds from their being accustomed, when in danger, either to squat on the ground or to sit motionless on a branch, so as to escape detection. Though, with birds, anger may be the chief and commonest cause of the erection of the feathers, it is probable that young cuckoos when looked at in the

[1] *Phaeton rubricauda:* "Ibis," vol. iii., 1861, p. 180.

[2] On the *Strix flammea*, Audubon, "Ornithological Biography," 1864, vol. ii., p. 407 I have observed other cases in the Zoological Gardens.

nest, and a hen with her chickens when approached by a dog, feel at least some terror. Mr. Tegetmeier informs me that, with game-cocks, the erection of the feathers on the head has long been recognized in the cockpit as a sign of cowardice."

In his chapter on the special expressions of animals, Mr. Darwin thus speaks of the monkeys: "With monkeys the expression of slight pain, or of any painful emotion, such as grief, vexation, jealousy, etc., is not easily distinguished from that of moderate anger; and these states of mind readily and quickly pass into each other. Grief, however, with some species is certainly exhibited by weeping. A woman, who sold a monkey to the Zoological Society, believed to have come from Borneo, said that it often cried; and Mr. Bartlett, as well as the keeper, Mr. Sutton, has repeatedly seen it, when grieved, or even when much pitied, weeping so copiously that the tears rolled down its cheeks. There is, however, something strange about this case, for two specimens subsequently kept in the Gardens, and believed to be the same species, have never been seen to weep, though they were carefully observed by the keeper and myself when much distressed and loudly screaming. Rengger states that the eyes of the *Cebus azaræ* fill with tears, but not sufficiently to overflow, when it is prevented getting some much-desired object, or is much frightened. Humboldt also asserts that the eyes of the *Callithrix sciureus* 'instantly fill with tears when it is seized with fear;' but when this pretty little monkey in the Zoological Gardens was teased, so as to cry out loudly, this did not occur. I do not, however, wish to throw the least doubt on the accuracy of Humboldt's statement.

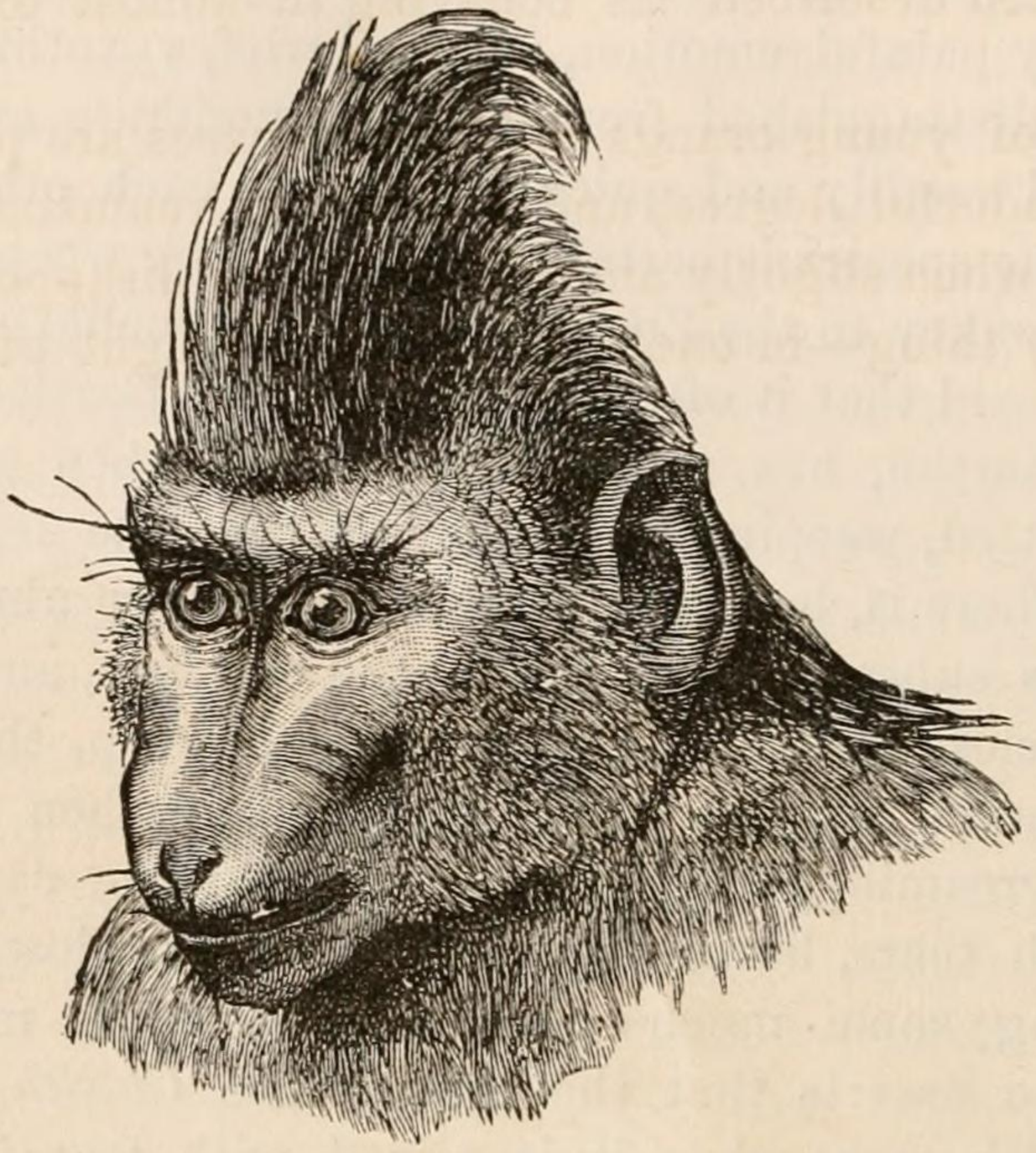
"The appearance of dejection in young orangs and chimpanzees, when out of health, is as plain and almost as pathetic as in the case of our children. This state of mind and body is shown by their listless movements, fallen countenances, dull eyes, and changed complexion.

"Baboons often show their passion and threaten their enemies in a very odd manner, namely, by opening their mouths widely, as in the act of yawning. Mr. Bartlett has often seen two baboons, when first placed in the same compartment, sitting opposite to each other and thus alternately opening their mouths; and this action seems frequently to end in a real yawn. Mr. Bartlett believes that each animal wishes to show to the other that he is provided with a formidable set of teeth, as is undoubtedly the case. As I could hardly credit the reality of this yawning gesture, Mr. Bartlett insulted an old baboon and put him into a violent passion; and he almost immediately thus acted. Some species of Macacus and of Cercopithecus behave in the same manner. Baboons likewise show their anger, as was observed by Brehm with those which he kept alive in Abyssinia, in another manner, namely, by striking the ground with one hand, 'like an angry man striking the table with his fist.' I have seen this movement with the baboons in the Zoological Gardens; but sometimes the action

seems rather to represent the searching for a stone or other object in their beds of straw.

"A young orang, made jealous by her keeper attending to another monkey, slightly uncovered her teeth, and, uttering a peevish noise

FIG. 9.



Cynopithecus niger, IN A PLACID CONDITION.—(Drawn from Life by Mr. Wolf.)

like *tish-shist*, turned her back on him. Both orangs and chimpanzees, when a little more angered, protrude their lips greatly, and make a

FIG. 10.

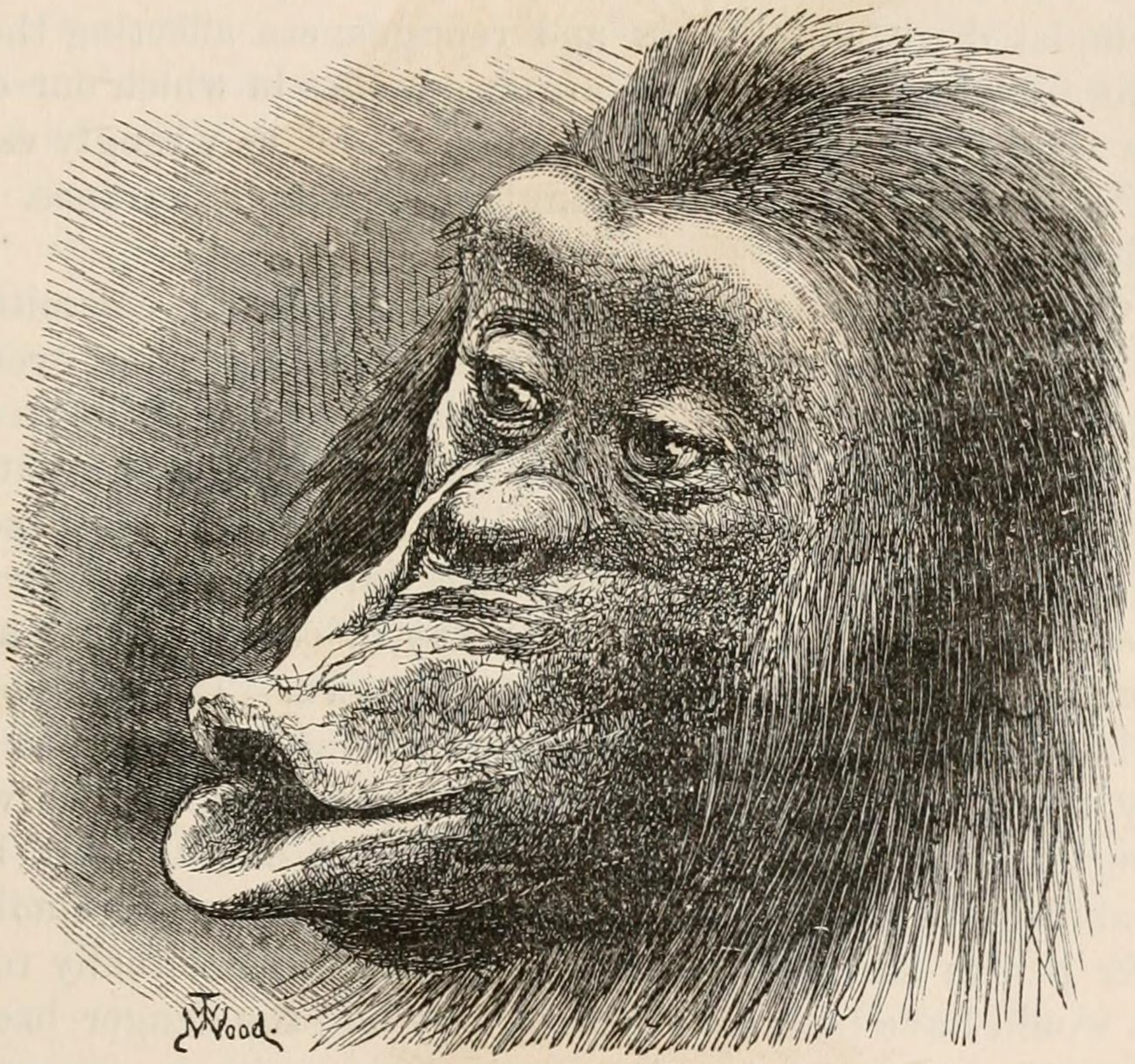
THE SAME, WHEN PLEASED BY BEING CARESSED.

harsh barking noise. A young female chimpanzee, in a violent passion, presented a curious resemblance to a child in the same state.

She screamed loudly with widely-open mouth, the lips being retracted so that the teeth were fully exposed. She threw her arms wildly about, sometimes clasping them over her head. She rolled on the ground, sometimes on her back, sometimes on her belly, and bit every thing within reach. A young gibbon (*Hylobates syndactylus*) in a passion has been described[1] as behaving in almost exactly the same manner.

"The lips of young orangs and chimpanzees are protruded, sometimes to a wonderful degree, under various circumstances. They act thus, not only when slightly angered, sulky, or disappointed, but when alarmed at any thing—in one instance, at the sight of a turtle[2]—and

FIG. 11.



CHIMPANZEE DISAPPOINTED AND SULKY.—(Drawn from Life by Mr. Wood.)

likewise when pleased. But neither the degree of protrusion nor the shape of the mouth is exactly the same, as I believe, in all cases; and the sounds which are then uttered are different. The accompanying drawing represents a chimpanzee made sulky by an orange having been offered him, and then taken away. A similar protrusion or pouting of the lips, though to a much slighter degree, may be seen in sulky children."

[1] G. Bennett, "Wanderings in New South Wales," etc., vol. ii., 1834, p. 153.
[2] W. C. Martin, "Natural History of Mammiferous Animals," 1841, p. 405.